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XVII.—*On the Migration of Cultivated Plants in reference to Ethnology; Articles of Food.* By JOHN CRAWFURD, Esq., F.R.S.

[*Read May* 8*th*, 1866.]

THE migration of cultivated plants is wholly the work of man, and its history, therefore, a legitimate branch of ethnology. In so far as vegetable sustenance is concerned, the earliest food of man, on his first appearance on earth, must of necessity have consisted of wild fruits and roots, wild corns and wild pulses, and these would certainly be more abundant than we now find them. The plants resorted to for this purpose would necessarily vary with climate. In temperate regions, the seeds of spontaneous grasses and pulses, and of a few marine plants, with acorns and honey, would be had recourse to. In tropical and subtropical regions, the available vegetable food of the early savage would consist of the date, the cocoa-nut, wild cereals, the yam, and other spontaneous roots.

Some races of man are still found in the primitive condition thus described. The natives of Australia, to this day, cultivate no plant, and have no other vegetable food than a few wild roots. The natives of the Andaman Islands have for their vegetable food only a coarse wild bean, and the still coarser fruit of the mangrove. In a similar condition are the inhabitants of Tierra del Fuego and the Esquimaux.

Even of the nomadic tribes of Northern Arabia, the chief vegetable food, down to the present day, consists of two wild uncultivated plants called in the Arabic language sambh and mesáa, but the technical denominations of which my accomplished friends, George Bentham and William Hooker, to whom I referred, have not succeeded in determining. Speaking of the first of these, the gifted traveller Palgrave says, "the ripening season is in July, when old and young, men and women, are all out to collect the unsown and untoiled-for harvest."

In America, from Canada to Florida, there grows in marshy land, on the banks of lakes and rivers, a species of grass, the seeds of which yield a nutritious corn, similar, but inferior, to the millets of the old world. This, in one of the prevalent American languages, is called the Tuscarora, and is the Zizania aquatica of botanists. Although capable of cultivation, it has never been cultivated, the superior maize having most probably dispensed with the necessity for it. It is, however, used as food by the wandering American tribes, as the two plants named in the last paragraph are by the Bedouins. In Southern Africa, the fruit of a species of wild gourd, called the nara, about the size of a cocoa-nut, is used as food by the natives, who, when it is ripe, repair periodically to the plains where it grows, to feast upon it. It is of the family of gourds, but its exact scientific place has not been determined.

That bold, skilful, and instructed traveller Mr. S. Baker, in those long and perilous journeys which happily ended in the discovery of the main source of the Nile, and of the true cause which has made Egypt immemorially fertile and famous, found the barbarous Africans in his route often living on the products of sporiferous plants. Among these were the fruit of the Doma palm, the Hyphæne thebaica of botanists, and the seeds of a species of nymphæa, which last were dried, stored to be ground and converted into a kind of porridge. This is an approach to the mere savage condition.

It would not be until, through increase of population, and wild plants becoming scarce, that the ingenuity of man would be stimulated to multiply them by cultivation. We have an example of the early steps in this progress in the condition of society among the South-Sea islanders, both fair and negro, who, when first seen by civilised man, were found cultivating the yam, the taro, or esculent caladium, the batata, the coco-palm, the banana, and the bread-fruit, but no cereal and no pulse.

In the present paper I propose to confine myself to the ethnological bearings of bread-plants, and begin with the most important of them, the cereals. These consist of wheat, barley, rye, oats, rice, maize, and several millets. Rye and oats are plants confined for the most part to Europe, but wheat and barley embrace a far wider range, for they extend to all the temperate, and even to the subtropical, regions of the Old World, from Spain to Japan, while within the last 350 years they have been transferred, through the enterprise of European nations, to the corresponding climates of the continents of America and Australia, in neither of which did any one of the principal cerealia of Europe previously exist whether in a wild or cultivated state. Rice is the principal cereal of all the tropical and subtropical countries of Asia, from Persia to Japan, and its culture has been extended to Europe, as will afterwards be noticed, only within the historical period. Maize is an exclusive product of America, and was as unknown to the Old World, before the first voyage of Columbus, as tobacco or the pine-apple. With a wider geographical range than any other of the cereals, it has invaded every country of the Old World, from the equator to the 50th degree of latitude, and is now the bread of many millions of people whose forefathers lived in ignorance of its existence. It is extensively cultivated in the southern provinces of China, in Japan, and in the islands of the Malay and Philippine archipelagos. Speke and Grant found it the principal corn in parts of the interior of Africa which the feet of white man had never trodden before their own, and in Italy and Spain it was a frequent crop within fifty years of the discovery of the New World. This wide and rapid extension maize owed to its adaptation to diversities of soil and climate, its hardihood, with consequent facility of propagation, and its eminent fecundity.

With the exception of rice, which is found growing wild in some parts of India, but which yet may have sprung from the seeds of the cultivated plant, not one of the cereals now enumerated can be traced with undoubted certainty to their wild originals, nor can we state their parent countries. This must be received as evidence of vast antiquity of cultivation. Ears of wheat and of barley have been found in the oldest Egyptian tombs of the same peculiar species or varieties as those cultivated in the same country at the present day; and in the Book of Genesis, in the poems of Homer, and in the oldest of the Hindu Vedas, these cereals are as familiarly referred to as they are now. Wheat and barley must have been well known to the Egyptians before the earliest of the pyramids was built, for a people feeding on roots and fruits could not have possessed the power or the skill indispensable to the construction of these stupendous monuments. The first culture of these corns, therefore, carries us very far back in the history of man himself. There is no good reason to think that wheat and barley may not have been just as early cultivated in Persia, India, China, and Japan, as in Egypt itself, although we have not the same satisfactory evidence of their having been so; and the same may be asserted of rice for tropical Asia, and even for maize in the case of the constructors of the temples of Mexico, and of the builders of Palenqué.

Millet, derived from the Latin *milium*, and coming to us indirectly in its present form through the French, is a common term for all the smaller cultivated cereals. These, of many species, are largely cultivated in all the warm countries of Europe and Asia, from the 40th degree of latitude to the equator. The most frequent of them belong to the genera Panicum and Sorghum, but they are not confined to these two. The late Dr. Hugh Falconer, the ablest and most accomplished naturalist whom I have known, told me, when I had the good fortune to have him for a guide, that the number of kinds of millet cultivated in the plains or mountains of India is not fewer than five-and-twenty. In Asiatic countries they form a large portion of the bread of the humbler classes. As to the history of their culture, it goes far beyond all record, and is probably of equal antiquity with that of wheat, barley, or rice. It is impossible to fix the parent country of any of these millets, and the probability is that they are indigenous in many, for we find them growing with the facility and vigour of native plants in such remote and unconnected regions as Italy, India, China, and Japan. Some of them are certainly found in a wild state, and even crops of some of these are occasionally gathered. In some parts of Asia, such as its islands, they seem to have been in a good measure superseded by the far superior corn, the American maize.

A great number of pulses, or leguminous plants, have been cultivated immemorially for food, at least in every part of the Old World. They belong to such genera as Vicia, Faba, Pisum, Ervum, Lathyrus, Orobus, Cicer, Phaseolus, Dolichos, etc., etc. In our narrow vocabulary they are all comprehended under the vernacular terms of peas, beans, vetches, lentils, etc. In those parts of Asia of which the principal cereal is rice, which contains but a small amount of gluten or nitrogenous matter, and where little animal matter is consumed, legumes are largely used as food to make up for the deficiency. Several of the cultivated legumes can be traced to their wild originals in Europe, while other sorts are traced to Africa, to Asia, and to America. The only parts of the world that produced no native legumes fit for cultivation were Australia and New Zealand, where they were equally absent as the cereals. This arose from no inaptitude of the soil and climate, for they now flourish in these Austral regions of every useful species.

The principal plants cultivated and yielding a farina, as substitutes for the bread of the cerealia, are the common potato or tuber-yielding solanum, the yam or dioscorea, the sweet potato, or tuber-yielding convolvulus, the sago-palm, the bread-fruit, and the banana. There are other plants, such as those yielding arrowroot and tapioca, but of far less importance.

The common potato (Solanum tuberosum) is an undoubted native of America, and there of a temperate climate. It is still found wild on the western slopes of the Andes, the tubers being no bigger than filberts. Even the rude red man was found to have cultivated the potato before the arrival of Europeans. It was brought from America direct to Ireland, and there first cultivated in 1586, or in about eighty years after the discovery of the New World. It is stated to have been still earlier introduced into Spain and Portugal. From Ireland it found its way to the Low Countries and to Germany, and from Spain it reached Italy and France. It is an object of cultivation in Asiatic countries only where Europeans have colonised or settled, and here chiefly for their consumption, and only since the beginning of the present century. It is successfully cultivated in Australia and New Zealand, which produced no esculent farinaceous food at all, not even the yam, the taro, or the manioc.

The yam, the Dioscorea of botanists, is a native only of tropical and subtropical climates. The genus to which it belongs is considered to consist of several distinct species, natives both of Asia and America, and in many places it is still to be found in the wild state. The plant is a slender creeper, yielding a huge tuber, often weighing from ten up to thirty pounds, consisting of a great mass of farinaceous matter, a wholesome but dry and insipid food, greatly inferior in flavour to the common, or even to the sweet, potato.

The sweet potato, or batata, the Convolvulus batatas, the Ipomæa batatas, and the Batatas edulis of botanists, is, like the yam, the plant of a warm climate. It is a native of the tropical parts of both Asia and America, but is stated not to have been an object of cultivation by the native Americans, the first mention of it being by Pigafetta, the companion of Magellan, in the first quarter of the fifteenth century. On this subject, however, I shall have occasion, before the conclusion of this paper, to make a few further observations. In the neighbourhood of the equator, the batata grows to a large size, often weighing several pounds: in Java, I have myself seen them of ten pounds weight, and occasionally they are said to reach even to fifty. In that island they enter largely into the food of the people; never, however, forming their principal vegetable diet, which is always rice.

One or more species of the botanic genera Ocimum, Arum, Caladium, Maranta, Tana, and Jatropha yield esculent roots, which in a rude state of society, in their respective native countries, were the only bread of the people before the culture of the cerealia began. Their starch in a refined state comes to us under the names of arrowroot, tapioca, cassada, salep, etc. The plants yielding these productions are, with few exceptions, natives of tropical or at least of very warm countries. Some of them in their crude and unprepared state are either poisonous or very acrid, but the savage cultivators had everywhere discovered that heat or edulcoration dissipated the poison, and rendered them wholesome food.

The taro, or Caladium esculentum, formed the principal bread of all the South-Sea islanders, who had no kind of corn; and the manioc, or Jatropha manioc, that of the rude inhabitants of native America, who had but one of the cerealia, and even that one not universally known and cultivated.

The bread-fruit, or Artocarpus incisa of botanists, in so far as concerns its use as bread, is confined to the tropical islands of the Pacific, to the inhabitants of which it formed a considerable article of diet, and, no doubt, contributed materially to the social advancement at which they had arrived when first seen by Europeans. At the recommendation of some theoretical botanists, the tree was conveyed in 1792, at great trouble and expense, to our West India islands, but with little advantage. In the wild state, the plant exists in the islands of the Malay archipelago, where, however, the immemorial possession of the cerealia seems to have superseded the necessity of cultivating it.

Some species of the musa or banana which yield a large portion of farinaceous matter are, either in their fresh or dry state, extensively used in the wild parts of America as bread, but, as far as I know, never so in any Asiatic country; and Baron Humboldt generalises rashly when he asserts that in all tropical countries the banana takes the place of the cereals of temperate and subtropical regions.

Sago, or more correctly sagu, is the name of the pith of several palms, natives of the Malayan and Philippine archipelagos. The most productive of these palms is the Sagus Rumphii, or Metroxylon Sagus of botanists. This and other species of the same genus have the peculiarity among palms of propagating themselves by lateral shoots as well as by seeds. They thrive only in bogs within the air of the sea, but excluding tidal action. A plantation once made perpetuates itself interminably. A sago-palm acquires maturity in about fifteen years. The stem is a mere case containing an immense mass of medulla or pith, which, when freed from fibrous matter, is a starch which, dried and granulated, or subjected to heat in earthen moulds, forms the bread of all the people of the Malay archipelago east of Celebes, as far as New Guinea inclusive. It is consumed also in Sumatra, Borneo, and even Mindano, the most westerly of the Philippines; but in these places, where the cerealia have long existed, sago is the bread only of the poor, or of barbarous tribes.

Language often throws light on the birth-place and migration of cultivated plants; and I, therefore, proceed to offer such remarks as have occurred to me, regarding those which I have now been referring to. To begin with the cereals, it will be found that they bear different nomes in every separate and independent language, or sisterhood of languages. In so far as philology can be considered evidence, this fact would seem to show, not that the culture of the cereals had originated at a single point, from which they were in course of time widely disseminated, but at many separate and independent points, foreign names only distinguishing them in the few instances in which they are exotics.

Thus, the English name for wheat is essentially the same in all the Teutonic languages. In Irish and Welsh, which I have elsewhere endeavoured to show are two distinct independent languages, we find two different names for this corn, it being *cruineachd* for the first, and *gwenith* for the last. The *trigo* of the Spanish and Portuguese is but a corruption of the *triticum* of the Latin; while the French *froment* and the Italian *frumento* are taken from a synonyme of the same language. But in the Basque, which, according to competent judges, differs not only from all other European languages but from all other tongues whatsoever, ancient or modern, we have two names for wheat wholly different from those of any other tongue, namely, *garia* and *ocaya*.

Having alluded to this singular language, the Basque, I think the names of cultivated plants in it may be safely referred to as evidence of the comparative antiquity of their culture by the people speaking it. Thus the names for wheat, barley and oats are purely Basque, while those for rye (*cecalea*), for rice (*avvoza*), for maize (*maiza*), and for the bean (*baba*), are taken from the Spanish. The inference is that the first-named plants were immemorially cultivated by the Basques, and the last only introduced into their country after the Roman conquest of Spain; indeed, after the Spanish language had assumed its present form.

If we look into the Oriental languages, we shall find in them evidence of the same tendency. In Sanskrit the name for wheat is *godhum*, and in Persian *gandum*, essentially the same word; but, as the people who spoke the Sanskrit language are believed to have emanated from a country forming part of Persia, it is not difficult to account for the agreement in this case. In Hindi the name is *gehun*, which seems to be an original word. In the Tamil we have the Sanskrit word in the corrupt form of *gudumai*; but the people speaking this language occupy the extreme southern part of India, within from eight to twelve degrees of the equator, and where wheat will only bear fruit in a few elevated tracts; and hence, as an exotic, it bears a foreign name.

In Turkish the name for wheat, *baghdoi*, is a native word. In Arabic we have two original and unborrowed ones for it, *hantah* and *bar*. From this, so far as etymology can be trusted, we infer that this corn is of indigenous culture both in the parent land of the Turks and in Arabia. In Java, within seven degrees of the equator, wheat will only yield grain at an elevation of 5,000 feet above the sea-level, and here it is sometimes called by its Portuguese name of *trigo*, and sometimes by its Persian name of *gandum*, pointing clearly enough to the parties who introduced it, and even to the comparatively recent time in which it was introduced.

An examination of the names for barley point to similar results as in the case of wheat. This word itself, as it exists in our language, has not, that I am aware, been traced to its parent source; but the name of the hardy four-rowed barley, *beer*, belongs to the Teutonic family of languages, and it was probably the earliest, as the easiest, variety cultivated in Britain. The French *orge* and the Italian *orzo* are but gross corruptions of the Latin *hordeum*. The names for barley in Gaelic and in Welsh are different, the first being *eorna*, and the last *haidd*. The name for oats is essentially the same in these two tongues, namely, *corc* for the Gaelic, and *ceirc* for the Welsh; but for rye the name in both languages, *seagl*, is evidently taken from the Latin *secale*, and we shall not err if we conclude that this corn was directly or indirectly introduced into our islands by the Romans. The Basque, again, furnishes an original name for this grain, namely, *garagarra*.

The Oriental languages furnish us with similar evidence in the case of barley, at it does in that of wheat. In Sanskrit the name for it is *yava*, of which the Hindi *jau*, and the Persian *jo* are certainly corruptions. In the language of the distant Tamils it is a widely different word, *shali*, which is probably but a common name for "corn." In Arabic the name is *shaer*, and in Turkish *arpa*, terms which have no connection with each other, or with those of any languages of Asia or of Europe, and so we come to the conclusion that this corn is indigenous; or, at least, that its culture was not borrowed from strangers in the countries in which these languages are spoken.

We cannot determine the native country or primitive locality of the first culture of rice to any particular Oriental region by philological evidence. This corn was unknown to the Greeks and Romans, at least as an object of cultivation, and has no original name in their languages. We may presume that it was equally unknown to the ancient Persians; for, had it been an object as well known to them as it now is to their descendants, it would hardly have failed to have attracted the notice, and to have been described by the Greeks, who had so much early intercourse with Persia. In Sanskrit the general name for rice is *dhanya*, and in Hindi it is *dhan*, a mere abbreviation of the same word; in the Tamil the name is *shali*. In each of the monosyllabic languages which extend from Bengal eastward to China inclusive, rice bears a different name. Thus we have it in the Peguan as *ha*, in the Siamese as *kao*, in the Cambodian as *ang-ka*, and in the Anam as *lua*. The many languages of the Malay and Philippine archipelagos are a signal exception to this diversity, for with them the general name is the same throughout, although the languages themselves often differ widely in words, in structure, and in sound. That name is *padi*, varied into *pari*, *pali*, *pasi*, and *vari*, according to national pronunciations, and it prevails not only from one extremity to the other of the two great archipelagos, but extends even to the language of remote Madagascar. There is but one exception to this uniformity, and it is found in the recondite and dead language of Java, called the Kawi, which abounds in Sanskrit, and in which the term is *dana*, an obvious corruption of the Sanskrit name already given.

The Persian name for rice is *shali*, which, as already stated, is that for it in the Tamil. This leads to the belief that the grain was most probably introduced into Persia from Southern India in the course of that maritime trade, which is known to have been carried on for ages between the ports on the western coast of India, where the Tamil is the vernacular tongue, and those on the Persian Gulf. Had this cereal reached Persia from Northern India, its name, as in the case of wheat, would have been traceable to the Sanskrit, or one of its derivatives.

The name for rice in Arabic is *arus*, and this is obviously the source of the *arros* of the Spanish, the *rizo* of the Italian, the *riz* of the French, and the *rice* of the English—the word increasing in corruption from Spain to Britain. It points to Spain as the country where the culture of this corn was first introduced into Europe by the Arabs. Rice, however, was probably known to the Greeks of the lower empire before the Arabian conquest of Spain ; but they too must have learnt it from the Arabs, for the name they gave to it, *aruza*, seems to be equally of Arabic origin as the names which it bears in the modern languages of Europe. The Arabic name itself may be supposed an original native word, and rice itself the indigenous plant of a country, the greater part of which is tropical, and therefore congenial to its growth.

The vast importance attached to rice by those of whom it is the chief bread-corn, and perhaps, also, the tendency of the Oriental languages to run into verbal redundance, is strikingly exemplified in the case of this corn. Rice sports into far more varieties than any of the corns familiar to Europeans, for some varieties grow in the water, and some in dry land ; some come to maturity in three months, while others take some four and some six months to do so. The Hindus, however, are not content with terms for such broad distinctions as might be derived from these obvious sources, but have names for varieties the distinctions between which are unappreciable by Europeans. In the north-western provinces of India, no fewer than sixty-six of these names have been enumerated, and in Bengal, of which rice is nearly the sole bread-corn, the number is said to be still greater. I state this on the authority of two men whose oriental knowledge was great and accurate, not only in language, but in every branch of useful or curious learning, the late Sir Henry Elliot, and my lamented friend Horace Hayman Wilson. But, besides terms for this corn founded on variety, on season, and on mode of culture, the grain itself bears one name in the straw, another when threshed, one name when in the husk, and another when freed from it, and a fifth when cooked. A similar redundance of terms is found in the languages of the Malay and Philippine Islands. Such minute nomenclatures seem to point to a great antiquity in the culture of this cereal with the people among whom they obtain.

Maize is beyond all question a native of America, and before the discovery of the New World was wholly unknown to the Old. The name as known to European nations is taken directly from the Spanish, and it is to be presumed that the conquerors of the New World borrowed it from one of the many languages of that continent. In some of the Oriental languages we have specific names for it, which seem entirely native—such as *bhutta* in Hindi, *jagung* in most of the languages of the Indian Archipelago, *katsalva* in the Madagascar. This would lead to the belief that the plant was indigenous where such names are given to it, but the probability is that they were taken from some native plant bearing a resemblance to maize. Thus, in the two principal languages of Southern India, maize is named after the chief millet cultivated in the peninsula, the *cholu* or *ragi*, the Cynosurus corocanus of botanists, to which an epithet implying its foreign origin is added. The Turks give it the name of *boghdai misr*, or the wheat of Egypt, which is not more amiss than the names given by the French and English when they call it Indian and Turkey corn.

Philological evidence applied to plants yielding starch, or esculent farina, affords somewhat more satisfactory evidence than in the case of the cerealia. One of the most important of the plants yielding this farina is the genus called by botanists Dioscorea, in our language the yam, and of which a dozen species, independent of varieties, have been enumerated by botanists. They are natives of Asia, Africa, and America, but of their tropical and subtropical parts only. The Spanish and Portuguese name of the dioscorea is *inhamé*, from which comes the French *igname*, and from that, with Anglo-Saxon brevity, "yam." I presume the Spanish name to be taken from some American language. In Hindi the general name given to all esculent bulbs and roots is *alu*. This, Professor Wilson tells us, was the name given by those who spoke the Sanskrit language to a species of cultivated arum, and not to the yam, with which, as an extra-tropical people, they must have been unacquainted. The generic name *alu*, with the prefixes *phul*, a flower, or *rath*, a chariot, are the names by which the Hindus of the north distinguish the yam. Not so, however, with the Hindus of the south, in whose country the yam is indigenous. As an example, it has in the Tamil the specific native name *kalangku*.

Like the word *alu* of the northern Hindus, the word *ubi*, especially applied to the yam, is used generically for all esculent roots and bulbs by the Malayan nations. It is one of very wide dissemination, for it prevails in not only all the many languages of the Malayan archipelago, but has been also extended to the Philippine tongues of a very different genius from the Malayan. It has done far more than this, for to the east it is found in the languages both of the lank-haired and woollyhaired races of the island of the Pacific, while to the west it has reached as far as Madagascar. The original word is of such simple structure that it has undergone no other change than the substitution of one labial for another, or the elision of its single consonant. Among the insular languages there are but few exceptions to this general prevalence, but there are a few. In the principal language of the Philippines, and in the dialect of the Sandwich islands, the only one of the great Polynesian language beyond the northern tropic, we have native names for the yam. One species or other of the dioscorea is, no doubt, indigenous in many of the islands of the Malay and Philippine archipelagos, and in these of the Pacific. I saw myself wild yams dug up in the woods of an island off the Cape of Cambodia which, probably from the frequency of the wild yam in it, takes its Malay name from it, for Pulo-ubi, the island in question, literally rendered, signifies "isle of yams." No doubt, it would be long used as food in its wild state by savage man, and it was probably first cultivated by a people who had made the first steps in progress, who would naturally give it its now wide-spread name. Who that people was, it is impossible to be sure of, but the Malays, or Javanese, as the most advanced and most enterprising, are the most probable.

The sweet potato, or tuber-yielding convolvulus, appears to be a native of many parts of the tropical old and new world. Some have alleged that it was first made an object of cultivation by the native Americans, but when the South-Sea Islands, whose inhabitants had assuredly no communication with any American people, were discovered, the sweet potato was found to be in cultivation, and known by a native name throughout, the word being essentially the same, and a native one, varying only in pronunciation, as *kumava, humäa,* and *gumala* abbreviated *mala.*

There is every appearance of the culture of the batata having been introduced into the islands of the Malay archipelago, and this by the Spaniards or Portuguese. In the Molucca Islands it accordingly goes under the name of *ubi kastela,* which signifies literally "the Castilian yam," for the Moluccas had been temporarily under the rule of Spain, already in possession of the neighbouring Philippines. The Javanese, dropping the generic word, and eliding the sibilant in the word Castilia, call the plant simply *catela.* The Javanese give it also the same name as the Spaniards, namely, batata, or patata. The probability, then, is, that the Spaniards introduced the plant from the neighbouring Philippines, where it seems, if we are to trust the evidence of language, to have been cultivated by the natives when the Spaniards conquered them. I find the plant accordingly designated by native names in the two leading languages of these islands, the Tagala and Bisaya, in the first of which it is called *gabi*, and in the last *kamoti*, a word, I may observe, adopted in Spanish dictionaries, and defined as the name of "a kind of sweet potato or batata."

In Upper India the plant is clearly an exotic, and shown to be out of its genial climate by the production of poor and small tubers. The name given to it is *shakarkand*, a word half Persian and half Hindi, and both of which signify sugar. The Tamil name is the American batata, slightly corrupted into *vatata.*

The common potato takes its European name from the sweet one, for the latter seems to have been known, and even cultivated, in the south of Spain before the first. Even at present, the name "potato" is given by the Anglo-Saxon Americans to the Convolvulus batatas, while to the common potato is given the epithet "Irish." At present, the Spaniards call the sweet potato batata, or batata di Malaga, and the common potato, patata, a mere change of one labial for another. The last is nearly our own name, and its source is therefore obvious. The original word is probably a native American one, but of what language I have not heard. The common potato had probably many native names, corresponding with the many tongues of America, for it was found by the discoverers cultivated both in North and South America. Whatever the origin of the name, the term is, at all events, better than the "earth-apple" of the French and Germans, or the "white truffle" of the Italians. In Hindustan, where the potato is now successfully cultivated, chiefly for European consumption, the name given to it is *balaiti alu*, or the "European esculent tuber." The Malays give it the name of *ubi yuropa*, that is, the "European yam," and the Javanese that of *kântang holanda*, or "tubers of Holland," the *kântang* being the name of the *Ocymum tuberosum*, or tuber-yielding basil, a plant cultivated in Java for its tubers, which in flavour bear a considerable resemblance to those of the common potato.

Sago, correctly *sâgu*, is simply the name of the prepared pith of the palms which yield it, and has no reference to any particular palm, of which there are not fewer than five distinct species of the genus. The word, probably of the Malay language, is of universal use throughout the Malay and Philippine archipelagos, and has long been adopted in the languages of Europe.

The bread-fruit, or *Artocarpus incisa* of botanists, is known in the Malay archipelago (according to the language of the country) under the various names of *sukun*, *kluwi*, *kulor*, and *tambul*, but none of these are the names which it bears in the tropical islands of the Pacific; and hence we may conclude that the South-Sea islanders are not indebted for it to the Malayan nations, as they are for some other cultivated products, such as the yam, the cocoa-nut palm, and the sugar-cane. This is, indeed, what might be inferred, without the help of etymology, from the character of the plant, which is of the size of a forest-tree, with perishable fruit, and consequently impossible of distant transport by a rude people. The plant is, no doubt, indigenous to the Pacific Islands, where alone it sports into several varieties, which have been reckoned as many as five, a proof of long cultivation. Even the name given to the bread-fruit is not uniform in all the dialects of the Polynesian language, for we have it in the Tonga as *me* and *marnai*, in the Tahiti as *vavo*, and in the Owihee as *ulu*.

I shall conclude this paper with a few general observations on the relative value of the plants enumerated in it, in so far as regards their influence on social progress. Of these, incomparably the most valuable to man are the cerealia. They are the most agreeable and the most wholesome, while they contain the greatest amount of nutriment in the smallest bulk. Their culture, moreover, demands a greater amount of skill and labour than the lower kinds of bread; and this is a quality belonging to them which, as it stimulates industry and ingenuity, is in a social view, of high value. It is useful that several of these cerealia should be cultivated together, so that in the event of the failure of one or two there should remain others to fall back upon. It must be admitted, however, that although the culture of several different cereals together may mitigate, it cannot prevent either dearths or famines, since the same drought or blight may, more or less, affect all of them. India, for example, in which a greater variety of cereals is cultivated than in Europe, has, nevertheless, been visited within the last hundred years with many dearths and several great famines, owing to the absence of the means of supplying the deficiency of one part of it by the superabundance of another. An easy and cheap intercourse between the different provinces of a country, and its free commercial intercourse with foreign countries possessing climates different from its own, are the only certain guarantees against scarcities and famines. These conditions, however, can exist only in the most advanced states of society, and are wholly absent in the early and rude stages of it, to which the present discussion refers.

It may be safely asserted that no people ever attained a tolerable degree of civilisation who did not cultivate one or other of the higher cerealia. The architectural monuments and the letters of Egypt, of ancient Greece and of Italy, of Assyria, of Northern India and of Northern China, were all produced by consumers of wheat. The monuments and letters of Southern India, of the Hindu-Chinese countries, of Southern China, of Java, and of Sumatra, were the products of a rice-cultivating and rice-consuming people. The architectural monuments of Mexico and Peru, and, we have no doubt, also of Palenqué, were produced by the cultivators and consumers of maize.

No cultivators and consumers of roots or fruits, it may be safely asserted, ever invented letters, or constructed a durable architecture. Among the Malays, whose bread is rice, the term "root-eater" is one of reproach, equivalent to savage. When the inhabitants of the celebrated Spice Islands were first seen by Europeans, their only bread was sago, or the pith of palms; and, notwithstanding the possession,—even the natural monopoly, of the then much-coveted clove and nutmeg, they were not only ignorant of letters but had not even the rudest kalendar. They had not even invented iron, which, together with their clothing, they received from strangers; and but for the accident of their spices, they must have been downright savages, hardly on a level with the South-Sea islanders. Had the bread of Britons some 2,000 years ago, been confined to the potato, Julius Cæsar would unquestionably have found our ancestors far greater barbarians than he describes them to have been, and they would surely not have encountered him with horses drawing armed chariots,

Perhaps the most advanced social position ever attained by men living on mere roots and fruits was that of the South-Sea islanders. They cultivated no cereal, not even the humblest millet, but they were well supplied with farina-yielding plants—such as the yam, the sweet potato, the taro, and the bread-fruit: still their advance was of the humblest, for they had not even invented pottery or textile fabrics, having nothing better than paper for raiment.

It is possible for a people to attain a very respectable civilisation when living on one of the chief cereals, although it be not the very highest. The mass of the Russians, and even of the Belgians, live on rye, and the mass of the people of Scotland on oats, although their condition would undoubtedly have been better had their bread been of wheat. The respectable amount of civilisation which the Irish had attained after their conversion to Christianity, and which resulted in the adoption of foreign letters, and the construction of the round towers, was accomplished by growers and consumers of barley and oats. Had they been strangers to these, and their main food consisted, as it afterwards did, of a single root, their ancient civilisation never could have existed: on the contrary, they would have been on a lower level than the South-sea islanders, who possessed a far greater variety of sustenance with a more benignant climate.

But the potato is by no means the lowest quality of bread on which a people can live and multiply. The lowest is that which is most easily produced, that is, which is produced with the smallest amount of skill and labour, and in this respect the banana is below the potato, and the sago perhaps even below the banana. The banana yields a crop in ten months from the time of planting, perpetuates itself by rattoons, and requires little care in its growth. Baron Alexander Humboldt reckons that the produce of the same extent of land in bananas and wheat is in the proportion of 135 of the banana to 1 of wheat, and that of the potato as 44 to 1. The sago-palm takes about ten years to yield its produce, but grows in a bog where nothing else will thrive, requires no care in culture, and like the banana propagates itself by shoots. Mr. Logan, the distinguished statist and philologist, estimates the produce of the sago-palm, compared with wheat, as 163 to 1, and as compared to the potato as 53 to 1. The quantity of nutriment contained in the banana and sago are by no means in the proportions thus given, for we have to deduct the large proportion of water which they contain, and the absence in them of gluten, the most nutritious portion of the cerealia. Baron Humboldt informs us that the Spanish settlers in America were so satisfied of the evil consequences of living on the banana that they frequently entertained the violent remedy of extirpating the plant, as the only cure for overcoming the apathy and idleness of those who made it their only bread—the Indians and half-breeds. The sago-feeders, however, are by no means so prepossessed in favour of sago, and never fail to prefer rice, or even the yam and sweet potato, their consumption of it being a matter of necessity, and not of choice.

Two plain objections to root and similar crops, as compared to cereals, remain to be noticed. The first is that they are, with few exceptions, incapable of being stored for a length of time, so that the superfluity of one harvest may make up for the deficiency of a future one. The potato lasts but for a year at best, and the tropical roots not much longer, while wheat, oats, and barley will keep for ten years, rice, in the husk, for fifty, while with the cereals there is far less difficulty in storing and transport.